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ABSTRACT

Educators today are under tremendous pressure to make use of the latest in technology while continuing to provide quality educational experiences for students. Quality staff development is essential and costly, especially in rural areas. This study looked at the use of mentoring as a positive strategy for building teacher confidence in technology application skills. The study emerged as a grant to direct funds into rural schools and was specifically targeted for educational improvement through technology implementation. Qualitative and quantitative data indicated that mentoring was a positive influence on teacher technology confidence, technology integration, school climate, and staff development effectiveness. (Contains 48 references.) (Author/AEF)

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Mentoring for Technology Success

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Abstract

Educators today are under tremendous pressure to make use of the latest in technology while continuing to provide quality educational experiences for students. Quality staff development is essential and costly, especially in rural areas. This study looked at the use of mentoring as a positive strategy for building teacher confidence in technology application skills. The study emerged as a grant to direct funds into rural schools and was specifically targeted for educational improvement through technology implementation. Qualitative and quantitative data indicated that mentoring was a positive influence on teacher technology confidence, technology integration, school climate, and staff development effectiveness.

Technology Manpower Needs and Teacher Technology Training

Career opportunities of today suggest that of the approximately 600,000 job openings currently advertised 450,000, are related to technology and knowledge of computer applications. Using technology as a tool to improve teaching and learning is a critical need in schools, but crucial to being employed in the future is knowing how to use advanced technology in a useful way (Dennis, 1998). In an Office of Technology Assessment (OTA) study of the use of technology in education, lack of training and limited knowledge about computers were the most commonly cited reasons for non-use of computers (1995). Recent studies continue to report that properly trained teachers make the difference between success or failure of technology integration efforts (Siegel, 1995). For technology based learning to be effective, teachers must select materials that help meet carefully defined instructional objectives and integrate them into learning experiences. It is time to acknowledge the vital role that teachers play in the successful use of technology for learning with support (Mellon, 1999). The 10-year ACOT project (Apple Classrooms of Tomorrow, Saltpeter, 1998) recommended that 30 percent of available technology resources be dedicated to providing ongoing staff development. A Time Magazine report claims that schools spent about $88 this year per student on computer equipment, but only $6 per student on computer training for teachers. Although 80 percent of schools have Internet access only 20 percent of teachers polled in this survey felt prepared to use technology in their classes (Nellen, 1999). A 1999 study by Market Data Retrieval (MDR) found that 61 percent of the teachers surveyed felt either "not at all prepared" or only "some what prepared" to effectively use new technology (Mckenzie, 2000

Professional Development

Statham and Torell (1996) have identified professional development as an essential condition necessary to maximize student achievement. Teachers are the keys to success, and training the teachers is essential. They state: "A commitment to technology integration includes a commitment to teacher training." The success or failure of technology is more dependent on human and contextual factors than on hardware or software (Valdez, et.al. 1999). Based on survey data Becker was able to determine that certain variables had 'important independent relationships to teachers use and valuation outcomes' (Becker, 1999). Significant factors were: quality connectivity, computer expertise, teacher pedagogical beliefs and practices, and adequate professional development (Becker, 1999). Research indicates that most school districts spend less than a quarter of their computer budgets on training (Bruder, 1993). Too often faculty professional development features one-shot workshops with limited support and follow-up for integration purposes (Hargreaves & Fullan, 1992). Joyce and Showers (1995) have argued that teacher development should be innovation-related, continuous over several sessions and involve a variety of formal and informal training sessions to meet the needs of the teacher. Their model emphasizes the need for the learner(teacher) to be shown how the application works, be provided an opportunity to practice with the application, then receive follow-up support to allow for further practice and related critical feedback

Recently staff developers spotlighted critical issues facing schools and identified mentoring programs as useful in teacher improvement (Ganser, 2000). Technology changes so fast, some teachers may not know how to keep up (Bray,1999). It would be most valuable to provide both time and opportunities for on the job professional development. On activities using technology applications of skill in the work world, students of teachers with more that ten hours of training significantly outperformed students whose teachers had five or fewer hours of training

(Becker, 1999). The use of on-sight teams or mentor groups can provide valuable guidance and increase the effectiveness of staff development time. (Dwyer, 1998).

Rural Needs

Many rural educators face these changes with the added challenge of geographic isolation. The unique needs of rural education have been recognized for generations (Leo-Nyquist & Theobald, 1997). When the education system was first established in the United States, technological improvements in printing and distribution made textbooks and educational information available to people living in rural areas. Yankee peddlers, in fact, influenced the content of textbooks by communicating to the printers the specific educational needs of rural America, (Smith, 1993). Distance education was first developed for use by farmers. Courses on repairing wagon wheels were offered to farmers who couldn't leave their fields. (Thomas, 1999). Beacham & Kester, (1994) identified telecommunications programs as useful to enhance professional growth in rural areas highlighting electronic mentoring as a strategy for bridging some of the challenges of rural isolation. Today advanced technology is able to provide rural communities with access to increased educational opportunities and information vital to quality education (Dennis, 1997).

Ferre and Associates (1988) and Kennedy and Barker (1986) identify financial and funding issues as the most critical issues faced by small rural school districts. Since nearly a quarter of the money for educational technology comes from state revenues, funding has been identified as a significant problem for a large segment of the country's educational community. Rural districts cannot compete with urban schools in the area of funding simply because of low enrollments. Corporations seek to fund programs that impact the largest numbers of students. In competing for grant dollars, rural schools are at a disadvantage because each staff member, from administration to faculty, is having to wear two or three "hats" (duty assignments) and do not have the time or experience to write successful grants (Dennis, 1997). So funding is difficult to obtain, technology is expensive and staff development effectiveness is essential.

Mentoring

The 10-year ACOT project (Apple Classrooms of Tomorrow, Saltpeter, 1998) recommended that 30 percent of available technology resources be dedicated to providing ongoing staff development. Teachers can improve their teaching practices by engaging in frequent and planned collaborative activities with other teachers. Such activities can include mentoring (Becker, 1999). Dwyer (1998) explores the theory and practice of mentoring. He argues that on –the-job mentoring has the potential to facilitate critical insight into the changing nature of teachers' work and to transform school cultures. Nellen reported that teachers participating in mentoring activities became confident enough about using technology to train new teachers, with a success rate of 100 percent (Nellen, 1999). Mentoring allows the learner's needs to define the experience rather than following a more linear, tutorial model of instruction (Nellen & Sweeny, 2000).

Similar research indicates that teacher mentoring can assist faculty members and new teachers with ongoing support and provides technology integration instruction that characterizes effective staff development (Mac Arthur et. al., 1993: Sprague et al., 1998). Anecdotal evidence from a range of mentoring projects is showing that through mentoring more significant learning occurs; a safer environment for risk-taking is developed and learning speeds up.

Mentors benefit from an increased feeling of self-worth and mentees from increased self-confidence. Adler and Harveil (1996) identified several benefits of mentoring programs that included; enhanced recognition of the value of staff development and teaming to make effective program changes and improved self-confidence in the receipt of support and encouragement. Receiving regular, honest and constructive feedback and being part of a professional network is mutually beneficial. Mentoring is seen as job-embedded, ongoing professional development which facilitates long-term change and transforms workplaces (Dwyer, 1998).

Curriculum Change

There is great deal of literature in the field on curriculum. Yet there is little empirical evidence that focuses upon attempts at curriculum change, where school districts, schools, or particular teachers are the unit of analysis (Lewis, 1998). Technology implementation requires a well-designed systemic plan, multiyear funding, and extensive professional development. Teachers, through their Internet connections, have access to resources that only a few years ago would have been impossible even for university researchers. Ninety percent of all teachers participating in Beckers research survey (with and without internet connectivity) ranked internet resources as either valuable or essential, demonstrating that teachers see the internet as a significant resource (Becker, 1999). With this

type of teacher use, sufficient staff development, and mentoring support, the integration of technology could be a supportive tool to enhance curriculum and the learning environment.

In the Mills study findings supported the position that teachers' concerns and perceptions of technology influenced the way in which they implement technology (Mills, 1999). The Lecompte, Millroy and Preissle study (1992) cited three common themes among teachers as they learned technology in the context of educational practice; 1) changes in teaching practice, 2) changes in preparation and 3) increased self-confidence with technology use. It is crucial therefore to integrate technology, pedagogy and application into competent staff development programs that demonstrate effective support for change (Moore, et. al., 1999).

Collins (1991) describes how these new teaching/learning environments differ from those of the past by citing trends identified from observations of schools that have begun using technology. The shift from lecture based, whole group instruction to coaching student-directed team-work that incorporates technology is a major change for the classroom teacher (Roblyer & Edwards, 2000). Well-developed curriculum can be the directional force that organizes and promotes technology implementation (Valdez, et.al.1999). Teachers in their critical roles as "gatekeepers" for change within their own classrooms and schools are central figures in curriculum development and change.(Leo-Nyquist, & Theobald, 1997).

Methodology

This action research study made comparisons between a traditional format of technology staff development to an onsite team-mentoring format. The traditional format of staff development incorporated two 2- day sessions of hands-on group technology instruction at the service center facility. The mentoring format used an onsite mentoring activity that included development of integrated classroom projects with onsite mentoring for collaborative support. Participation in the study was voluntary and school sites were allowed to send one team. Teams were self-selected and four schools participated. None of those participating in the mentoring project reported previously integrating technology into classroom curriculum. In each team, the member who felt most comfortable with technology skills was designated as mentor. All four schools were located within a 100 mile radius of the service center facility, located in communities with a similar agri-related economy, and classified 1-A (rural). Grant funding was budgeted to include upgrading of available hardware and software to support the individual projects designed by the teams. Funding also included stipends for extra planning and student contact hours.

Data collection was based on Profiler scores, observations, interviews and anecdotal information collected by the technology facilitator. The Profiler is a standardized online survey, developed by South Central Regional Technology in Education Consortium (SCRTEC) (http:///profiler.scrtec.org/profiler/), which includes 30 questions that assess personal confidence in technology skill and application. The survey was taken by teachers and students participating in the study as a pre and post assessment for each activity. SCRTEC is one of six Regional Technology in Education Consortia funded by the U.S. Dept. of Education, whose goal is to help teachers and other educators create, share, or find solutions to problems encountered when integrating technology into education.

Treatment

Using PowerPoint or Hyperstudio, students created presentations based on personal history. After initial instruction concerning the content of the social studies project and demonstrations of software and digital camera application, students created an outline of personal events and information that they wished to include in their presentation. Student mentoring teams then used the digital camera to collect pictures. The pictures were used as information focal points of the presentation. Students worked on formatting skills and added text to complete the history. Issues of vocabulary and editing, as well as the creative aspects of presentation development, were all part of the integrated project. Presentations were shared in a variety of ways including peer review, printed hardcopy and student conferencing. The presentations were used as examples of authentic assessment of student technology skill and social studies goals of development of personal identity, culture and community identity. Three school sites participated in teacher and student mentoring activities. Due to complications with teacher re-assignment one of the four schools did not participate in the mentoring activities.

Results

Concluding data indicated that all teachers and students completing the mentoring activities increased on profiler scores indicating that self-reported confidence of technology skills ability increased. In comparing teacher mentoring team scores before and after each type of activity (traditional staff development and mentoring activity) data show that teacher scores improved 21.33 percent more from the mentoring activity than from the more traditional staff development (Figure 1.1 & 1.3). This is three times the gain of 7.78 percent made after traditional

staff development. While traditional staff development does provide positive opportunity for teacher improvement, the addition of a mentoring program appears to greatly enhance the effectiveness of technology integration training. When comparing groups of students, those participating in mentoring activities scored over 11 percent higher than those involved with technology projects without mentoring partners (Figure 1.1 & 1.4).

1.1 Student Perception of Comfort With Technology

School site	1	2	3	4
Class A Mentor (group 1)	5.93	11.74	8.19	18.14
Class B Mentored (group 2)	15.37	6.89	7.27	18.14
Total Avg. Increase	10.65	9.32	7.73	18.14

(School sit #3 completed the technology project without mentoring)

1.2 Teacher Perception of Comfort with Technology

School site	1		2		3		4	
Teacher	1	2	1	2	1	2	1	2
1=mentee 2=mentor								
Pretest	16.67	X	4.44	22.22	22.22	51.11	42.22	24.44
Staff development	20.00	32.22	57.77	31.00	25.56	60 .00	60.00	30.00
Posttest	74.44	48.89	75.55	55.56	X	X	1.11	57.78
Total Avg. Increase	57.77	16.67	21.11	33.34	3.34	17.78	38.89	33.34

(Note: The X indicates that there was no profiler score and in both cases also indicates that the teacher was not involved with the project during the designated time of evaluation.)
School site #3 did not participate in mentoring during the technology project.

1.3 Profiler Average Teacher Change

After Staff Development	8.46%
After Mentoring Activity	29.21%

1.4 Profiler Average Student Change

Without mentoring activity	7.73%
Completing mentoring activity	18.75%

Conclusion

Final evaluation interviews indicated that teachers and students felt the project mutually beneficial. Having a team member or mentor close by for support helped to promote confidence when presenting content and having students work with technology. Teachers also believed that having a colleague/mentor for collaboration increased their ability to work through a variety of technical problems. Students demonstrated greater interest in content and were more involved in reflective evaluation to improve their work. Teachers were excited by the positive responses of their students and the increased motivation they observed. The key goal of improving student performance was realized through integration of a variety of technology tools. This success provided strong encouragement for teachers to look for other opportunities to integrate technology.

Research project results mirrored those of the Nellen study (1999), with 100 percent of teachers participating in the mentoring activity. Teachers indicated that they felt the experience so valuable they intended to continue the mentoring format during the next year by instigating new technology mentoring projects. Comments made by teachers during exit interviews provided anecdotal evidence of confidence. One teacher said, "I never thought that I could learn to use technology like this. Now we already have plans for another mentoring project next year and my students are asking if they can do other projects with the computers." Another teacher enthusiastically remarked, "I saw two other project ideas that I'm going to integrate into our standard curriculum and I'm helping

another teacher make plans for a project for next year." Comments such as these document the increase in teacher confidence integrating technology into curriculum.

The use of mentoring adds a positive support for technology integration in the classroom. It's application is inexpensive, enhances traditional staff development and promotes positive staff team-building. The use of mentoring demonstrated effectiveness with both teacher and student teams. It was evident from observations and interviews that that mentoring projects between classes increased student interactivity and promoted positive school climate. The ability of mentoring teams to discuss, reflect and support each other encouraged risk-taking and self-improvement.

Additional study in the area of mentoring to enhance technology integration would be beneficial. To gain further statistical analysis of mentoring application it would be valuable to design research that would control for external variables such as grade level and project variation. The establishment of mentoring teams and mentoring training within a rural district would increase the effectiveness of teachers as resources and encourage growth and development. Mentoring encourages a positive teamwork effort to promotes educational improvement.

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